IN THE UNITED STATES DISTRICT COURT
FOR THE WESTERN DISTRICT OF TEXAS
WACO DIVISION

EPISTAR CORPORATION,	§	
	§	
Plaintiffs,	§	
	§	
v.	§	
	§	**CASE NO. 6:20-cv-00420-ADA**
LOWE'S COMPANIES, INC.,	§	
LOWE'S HOME CENTERS, LLC,	§	
	§	
Defendants.	§	

DECLARATION OF ALAN DOOLITTLE PH.D., IN SUPPORT OF DEFENDANT'S OPENING CLAIM CONSTRUCTION BRIEF

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I, Alan Doolittle Ph.D., the undersigned, state and declare as follows:

I. INTRODUCTION

1. I have been retained as an expert on behalf of Lowe's Companies, Inc. and Lowe's Home Centers, LLC ("Lowe's") to provide my analyses and conclusions regarding technical issues related to the claim construction disputes raised by Lowe's and Epistar Corporation ("Epistar") and also to review and respond to the opinions presented by Eugene Fitzgerald, Ph.D. Those claim construction disputes relate to five United States patents: 7,489,068 ("the '068 patent"), 8,240,881 ("the '881 patent"), 9,065,022 ("the '022 patent"), 9,664,340 ("the '340 patent"), and 10,224,455 ("the '455 patent"), collectively "the asserted patents."

2. I do not have any financial or other interest in the outcome of this matter or in any of the parties to these actions. My hourly rate is $450/hour, and my compensation does not depend in any way upon the contents of this report, the outcome of this proceeding, or the results of my service as an expert.

II. QUALIFICATIONS

3. The following paragraphs provide a summary of my qualifications. My curriculum vitae is also provided as an attachment to this declaration.

4. I am the Joseph M. Pettit Professor in the School of Electrical and Computer Engineering at Georgia Institute of Technology ("Georgia Tech").

5. I received a Bachelor's degree in Electrical Engineering from Georgia Tech in 1989. I then received a Doctorate in Electrical Engineering from Georgia Tech in 1996.

6. Since obtaining my Ph.D., I have held numerous roles at Georgia Tech, including professor, associate professor, assistant professor, and research engineer. I have won numerous

awards for my teaching and research, including the 2004 National Science Foundation CAREER Award, Multidisciplinary University Research Initiative awards for Epitaxial Multifunctional Materials and Applications, Laboratory Instrumentation Design Research for Scalable Next Generation Epitaxy, and Cross Disciplinary Electronic-ionic Research Enabling Biologically Realistic Autonomous Learning, and numerous teaching awards.

7. I have published over 167 refereed journal and conference papers and conference proceedings in the subject matter areas of compound semiconductor materials and devices for detectors. These works have been published in journals including Journal of Crystal Growth, Journal of Applied Physics, IEEE Journal of Photovoltaics, Electronic Materials Letters, and Current Topics in Solid State Physics, among many others. I am a named inventor on 12 issued patents and four pending applications. I am the founder of two companies, Innovative Advanced Materials Inc. and Innovative Advanced Technologies. Both companies focus on commercialization of state of the art epitaxial growth systems that bridge the benefits of the two most popular growth methodologies, metal-organic chemical vapor deposition (MOCVD) and molecular beam epitaxy (MBE). I have been awarded numerous grants totaling in excess of 38 million dollars and have published numerous papers that examine III-Nitride light-emitting diodes (LEDs) (including ultraviolet (UV) LEDs), solar cells, photodetectors and various transistors including high electron mobility transistors (HEMTs) and heterojunction bipolar transistors (HBTs) as well as the fundamental physics of III-Nitride epitaxial growth.

8. I have given over 150 talks and seminars in the U.S. and abroad, including over 35 invited and keynote addresses. I am also a Senior Member of the Institute of Electrical Electronic Engineering (IEEE). I have twice (2016 and 2019) been selected by a diverse international advisory committee made up of some of the most prominent scientists in the III-

Nitride semiconductor community to lead (Chair) the two largest conferences in the field: the International Workshop on Nitride Semiconductors (IWN 2016) and the International Conference on Nitride Semiconductors (ICNS 2019). Additionally, I have served as a program chair selecting the best contributions and organizing lectures for each of these meetings in 2010 (IWN) and 2013/2017 (ICNS). In these capacities, I have not only been recognized as an international leader in the field but also as an expert in what the entire III-Nitride community is doing.

III. LEVEL OF ORDINARY SKILL IN THE ART

9. I have reviewed Dr. Fitzgerald's explanation of the person having ordinary skill in the art, which is provided at paragraphs 10 and 11 of his declaration.

10. Like Dr. Fitzgerald, I believe that my education, training, and experience position me to understand the skill level of a person having ordinary skill in the art and to adopt that viewpoint for purposes of my opinions. For purposes of my opinions provided herein, I have used Dr. Fitzgerald's definition of the person having ordinary skill in the art. Like Dr. Fitzgerald, I am very familiar with people having the described skill level and the knowledge base associated with that skill level.

IV. CLAIM CONSTRUCTION PRINCIPLES

11. I do not suggest that I am an expert on the principles of claim construction. My understanding is that claim construction is to be decided by the judge, who I understand is well aware of the principles of claim construction. My role, as I understand it, is simply to provide technical assistance by explaining how certain terms would have been understood by a person having ordinary skill in the art.

V. THE '068 PATENT

A. "substrate"/"transparent substrate"

12. Although the terms "substrate" and "transparent substrate" appear in a number of the asserted patent claims, I understand that the parties have agreed to address that term first in the context of the '068 patent. Based on my review of the patents, I believe that a person having ordinary skill in the art would have understood the same plain and ordinary meaning in all relevant asserted patents, and therefore, that the same analysis applies – a solid support.

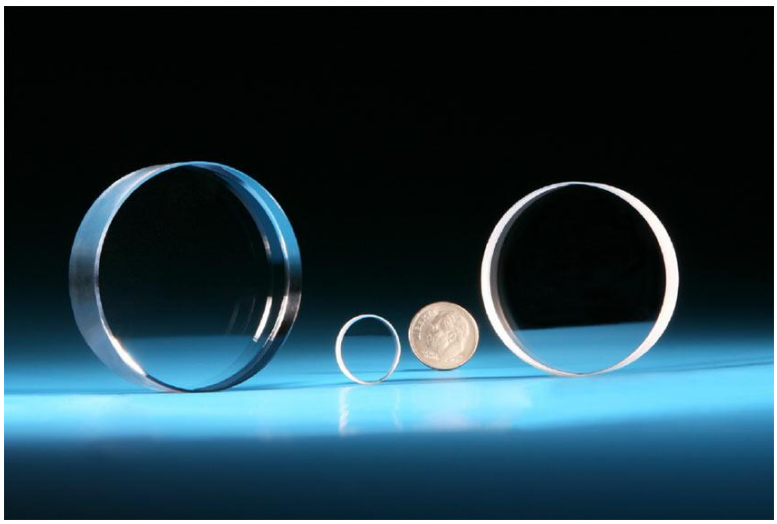
13. I reviewed Dr. Fitzgerald's discussion of the term "substrate" and disagree with that analysis and his conclusions. Dr. Fitzgerald believes that a person having ordinary skill in the art would have understood the term "substrate" differently in each relevant patent. The term "substrate," in my view, would have been understood to have a broad ordinary meaning to a person of ordinary skill across the patents and would not have considered the exemplary details described in the specifications or shown in the drawings to narrowly define that broad term. That ordinary meaning would have been a solid support. When additional requirements are required beyond being a solid support, additional qualifying language like the adjective "growth" are added to further limit that broad meaning.

14. Instead of recognizing that ordinary meaning, Dr. Fitzgerald vaguely suggests that the term "substrate" implies "certain engineering properties" in each relevant patent. With respect to the 068 patent, Dr. Fitzgerald discusses optical properties, but the optical properties are separately recited in the word "transparent," and therefore, should not be used to limit the word substrate.

15. As to the word "transparent," there too I disagree with Dr. Fitzgerald. Like ordinary window glass, the word transparent means that object on the far side can be seen clearly

through the material. Transparency is contrasted with the distinct optical property translucency, which is exemplified by frosted glass. Unlike ordinary window glass, a surface treatment in frosted glass allows light to pass through, but images from the far side cannot be perceived due to light scattering. Finally, for completeness, a material can also have the optical property of opacity, by which light is blocked from passing through.

16. The concept of transparent materials in the LED field is also exemplified by sapphire, which is a natural gem (corundum), but is also used as a substrate in the manufacture of LEDs. The chemical formula for both the natural gem and its manmade alternative is Al_2O_3. In the gem form, trace minerals provide color, but pure manmade sapphire as used in some watch faces possesses exceptional transparency.



Sapphire is the crystalline form of Al_2O_3 used in the LED industry and for some watch cover lenses known for its superb transparency. Image from https://rayotek.com/sapphire-window-flat.htm

17. In paragraph 16 of his declaration, Dr. Fitzgerald gives the opinion that "[t]he term 'clearly seen' is ambiguous for someone working in the LED field." I disagree with this statement, as being able to see through a material is a concept within the understanding of

basically everyone. A person having ordinary skill in the art would have been well acquainted with the basic optical property known as transparency. Although that skilled artisan might use slightly more complicated words, from the perspective of a lay person (a juror for example), the description of a transparent material as being one through which objects can be clearly seen is simple and accurate. To give an apt example, LED based light bulbs generally come in two different types – clear and frosted. For clear bulbs, the light emitters can be clearly seen through the bulb's globe, but for frosted bulbs the light emitters cannot be seen, but instead are obscured by the frosted globe.

18. Instead of addressing the ordinary meaning of "transparent," Dr. Fitzgerald opines that "a material can be transparent, yet one may not be able to discern the shape of objects through it as the light can change directions within the material." (Fitzgerald Decl. para. 16.) I disagree with his analysis, which simply adopts his conclusion as a premise. A material that possesses the property of having a significant percentage of the light passing through it, but that is dispersed by the material, would be described as translucent rather than transparent. Dr. Fitzgerald does not cite any source for his opinion, which appears to be based solely on his personal view. I have reviewed the extrinsic sources cited by Lowe's including dictionaries and agree with the meanings provided therein for transparent and translucent.

19. To support his opinion, Dr. Fitzgerald identifies "colonial glass," which he describes as having "dimples," as a non-transparent type of glass. (Fitzgerald Decl. para. 16.) Although I have heard of colonial glass, I don't understand how that example is remotely relevant to the issue Dr. Fitzgerald raised. First, the material used for colonial glass is transparent, although its surface properties provide a lower quality viewing experience than

modern window glass. Second, Dr. Fitzgerald relies on the viewpoint of "someone working in the LED field," for which colonial glass is simply not relevant.

20. Dr. Fitzgerald also identifies the man-made ceramic material "alumina" as "relevant to patent embodiments." (Fitzgerald Decl. para. 16.) He does not identify the specific embodiments he is referencing and my review of the relevant patents has not identified any use of the term alumina or polycrystalline in the specifications. The embodiment he identifies appears to be one of his own creation. He also gives his opinion that "alumina substrates are transparent to visible wavelengths" (Fitzgerald Decl. para. 16.) which is grossly inaccurate in all but the rarest of situations. Again, Dr. Fitzgerald uses his own unsupported definition of transparent to support his own conclusion that alumina is transparent. Without any independent source to support his conclusion that alumina is transparent rather than translucent, it appears that his analysis is based solely on his own idiosyncratic view rather than a general understanding in the relevant field. Dr. Fitzgerald's description of alumina as "polycrystalline Al_2O_3" is also not entirely accurate. Alumina is generally understood to include oxygen deficiency defects, and porosity which are both related to its white (not transparent) color and light scattering qualities.

Pictured above is alumina (a polycrystalline ceramic known for its white appearance). Dr. Fitzgerald's claim alumina is "transparent" is grossly inaccurate in all but the rarest of situations.[1]

21. Finally, Dr. Fitzgerald gives the opinion that the term "substrate" has an ordinary meaning that "the material for the substrate must be able to allow LED chips to be bonded on it." (Fitzgerald Decl. para. 16.) Rather than a definition of the ordinary meaning of the term substrate in the art, his opinion is directed to the specific way that a substrate is used in the '068 patent.

B. "a light emitting stack having a first diffusing surface"

22. The second term in dispute for the '068 patent is "light emitting stack having a first diffusing surface." The term "diffusing surface" is separately addressed in the next section.

23. The first paragraph of Dr. Fitzgerald's discussion of this term appears to be a review of certain characteristics of the structure disclosed in the specification as a "light emitting stack." It is unclear to me whether he considers all of those characteristics to be examples or instead a definition of the term. Although I am not an expert in claim construction, my understanding is that examples from the specification are not part of a claim term's ordinary meaning. Instead, my analysis is simply seeking to understand how a person having ordinary skill in the art would have understood the disputed term after reviewing the specification, but without importing details from the specification. Dr. Fitzgerald's discussion, therefore, is either superfluous or incorrect.

24. Dr. Fitzgerald does not explain whether he considers the use of the word "stack" to be a technical term or the use of a non-technical term to describe a property of LEDs. Based on my knowledge and experience in the LED field, the term "stack" would not have been

[1] Image from http://www.machiningceramicparts.com/

understood by a person having ordinary skill in the art as of the filing date of the '068 patent as a technical term. Instead, stack would have been seen as a simple English-language usage to describe an arrangement of layers one atop another. That usage also applies to a stack of chairs, bowls, or books.

25. Based on Dr. Fitzgerald's conclusion, it appears that he believes that the term "stack" requires planarity. I disagree. Although light emitting devices, including LEDs, are generally understood to be made of layers of material, a person having ordinary skill in the art would not have included a specific layer shape as part of the ordinary meaning of the term "light emitting stack." Light emitting devices would have been understood to encompass devices having curved or pyramidal shapes. The word "stacked" in this context merely relates to the idea of layers arranged one on top of another. Again, I have reviewed the extrinsic evidence cited by Lowe's and agree that those definitions are consistent with the non-technical term stack.

26. My opinion that planarity is not required by the phrase "light emitting stack" is also informed by the specification of the '068 patent, which depicts and describes a layer 132 that is not planar. Instead, layer 132 as depicted in figure 3 has a non-planar surface. And the specification of the '068 patent confirms that the surface can include semi-spheres, pyramids and pyramid polygons. ('068 patent at 5:29-36.) A planar (*i.e.*, flat) shape is instead described with respect to prior art figure 1. Put simply, a light emitting stack may be planar, but that term is not limited to a particular shape.

C. "diffusing surface"

27. The third disputed term in the '068 patent is diffusing surface. Returning again to an example I used above, diffusion in the context of lighting can be understood based on the

difference between a bulb having a clear (*i.e.*, transparent) globe and one having a frosted (*i.e.* translucent) globe.

Examples of a transparent bulb (above left is incandescent filament) where the light source is clearly seen and (above right) a translucent bulb in which the light source is not clearly seen.[2]

The light from a frosted globe is often referred to as soft light because the light is diffused (spread out) by the globe. Whereas the filament in an incandescent bulb would appear to be an incredibly bright line if looked at directly, the LEDs in an LED bulb would appear to be incredibly bright points of light if looked at directly. In both incandescent and LED bulbs, frosted glass is often used to diffuse or obscure the light source so that it appears to come from the entire frosted glass globe, which is significantly larger than the filament or LEDs. This effect is known as diffusing the light. In an optical sense, the image of the original light source (filament or LED) is no longer visible through the frosted/translucent globe, even though light is emitted through the globe. For a clear bulb, the smaller source can be seen directly through the globe, and therefore, the light will have a harsher appearance than light from a frosted globe. The spreading out of light from a frosted bulb is known as diffusion and the resulting light can be

[2] Images from www.bulbsandfittings.com, and https://www.homedepot.com/p/40-Watt-Equivalent-G25-Medium-Base-Dimmable-Frosted-LED-Light-Bulb-Warm-White-TL5044/307454159.

described as more diffuse than light coming from a clear bulb. This diffusion results from the translucent quality of the frosted bulb, where the light is scattered broadly as it passes through the globe. Again, this view is consistent with the extrinsic sources cited by Lowe's.

28. In my view, Dr. Fitzgerald's error results from his focus on reflection in his analysis rather than the combination of reflection and refraction as would have been understood by a person having ordinary skill in the art. To start with, it is helpful to understand that the light generated within the active layer of an LED is omnidirectional, meaning that when an electron and hole combine in the active layer to emit a photon, that photon can travel in any direction. Figure 1 of the '068 patent provides an example light beam traveling towards a flat interface to air. For the specific beam shown in figure 1, a portion of the light will refract through the surface from the higher index of refraction medium n1 to the lower index of refraction medium n2 and a portion will reflect back into higher index of refraction medium n1. The ratio of refraction to reflection is greatest when the light beam intersects the surface normally (*i.e.*, at 90^{o}). That relationship decreases as the angle becomes smaller until a critical angle is reached at which total internal reflection results (*i.e.*, no light refracts through the surface). According to Snell's law, which is described in the background section of the '068 patent, the critical angle is related to the difference in indices of refraction of the two media.

29. That light refracts (bends toward or away from the local axis normal to an interface) at the interface between two media having different refractive indices is related to the fact that light travels faster in a lower index medium than it does in a higher index medium. What is generally referred to as the "constant" speed of light is actually the speed of light in a vacuum. However, light travels at a different speed depending the medium it is propagating through. The index of refraction of a medium can be defined as the ratio of the speed of light in a

vacuum to the speed light travels in the material and describes the materials "optical density". Said another way, the index of refraction is a measure of the "optical impedance" of the material in an analogous way to electrical resistance impeding electron flow, and acoustic impedance slowing down sound. Two different materials can have the same or differing optical impedances. If the materials have the same optical impedance, then no reflection occurs and light passes unchanged through the interface. If the two materials have different optical impedances, reflection occurs and refraction can occur depending on other considerations such as the incident (approach) angle of the light. Refraction results when light slows down or speed up as it enters a different medium, with refraction toward the normal occurring when entering a lower index medium and away from the normal when entering a higher index medium. The bending of light as it exits from water into air is the reason that straight objects in water appear bent when partially submerged in water when viewed from air.

30. That light both reflects from and refracts through a transition between different indices of refraction and explains why a person looking at transparent window glass can both see through the glass and can also see a reflection in the glass. A diffusing surface as described in the '068 patent differs from a flat surface by comprising an uneven surface. The uneven features making up the surface are able to reflect and refract light that strikes the surface. As shown in figure 2 of the '068 patent and as described in the corresponding text, the surface provides a diffuse light field by both reflection and refraction, spreading the light out in all in all directions. The diffusing surface described in the '068 patent is made up of microscale features, which can be of different shapes, that make the contact surface between media having two different refractive indices.

31. That the different media must have different refractive indices is apparent from Snell's law, which can be written out as $n_1 \sin\theta_1 = n_2 \sin\theta_2$. If the refractive indices are equal the materials are said to be impedance matched and no reflection or refraction should result at the interface and instead a ray of light will continue along its same path. Index matching materials, which are designed to match the refractive indices of other materials, are employed for precisely this reason - to avoid reflection or refraction at the interface.

32. In paragraph 25, Dr. Fitzgerald claims that the disclosed diffusing service is not a scattering surface. Because scattering would have been understood as a mechanism that diffuses light, Dr. Fitzgerald's attempt to exclude scattering is simply wrong.

D. "a transparent adhesive layer between the transparent substrate and the first diffusing surface, wherein an index of refraction of the light emitting stack is different from that of the transparent adhesive layer"

33. I discussed the meaning of transparent above, and therefore, I will not repeat that discussion here.

34. As to the term "adhesive," I note that the '068 patent uses that term more broadly than would typically be interpreted by including "polyimide, benzocyclobutene (BCB), prefluorocyclobutane (PFCB) or indium tin oxide" as examples of adhesive materials. ('068 patent 4:61-63.) Indium tin oxide is a solid semiconducting material with no particular "sticky" properties generally attributed to adhesives and thus, would not usually be considered an adhesive. Thus, the term "adhesive" merely implies a material that can bond materials together. That meaning is also consistent with the dictionary definitions cited by Lowe's in its brief.

35. The remainder of the above quoted language describes the two materials that contact each other at the diffusing surface – the light emitting stack and the transparent adhesive layer. As discussed above, the diffusing surface has two different indices of refraction, such that some of the light that strikes the surface reflects and some of the light refracts through the

surface. Only by having differing indices of refraction on either side of the diffusing surface does reflection and refraction as shown in figure 2 result. If instead the materials had the same refractive indices, as discussed above, light would simply pass through the interface as if the interface did not exist.

36. I understand that Dr. Fitzgerald objected to the use of the speed of light in a material as part of the definition of index of refraction. (Fitzgerald Decl. para. 27.) While he characterizes refractive index as a "physical property of each material," that is precisely what Lowe's' proposed construction suggests – a physical property that can be characterized for each material. Dr. Fitzgerald's core objection appears to be that index of refraction may alternatively be stated as dielectric constant. The mere fact that a physical property of a material may be expressed in multiple ways does not suggest that Lowe's' proposal is incorrect. I note that Epistar has not provided any proposed construction for index of refraction, rendering its argument hollow in my view.

E. "rough"

37. The final term in dispute for the '068 patent is rough. In paragraph 28 of his declaration, Dr. Fitzgerald equates rough with "reflective properties." That description, however, is wrong. A flat surface or a rough surface can be reflective. Diffusive properties result from having an uneven surface with features that presents differently angled surfaces to the incoming light. The surface features must be large enough to interact with the incoming light. Features significantly smaller than the wavelength of light will not result in diffusion. In fact, the surface of ordinary window glass lacks surface features sufficiently large to diffract light, but need not be flat at scales of approximately 300 nanometers or less.

38. Dr. Fitzgerald's criticism that not all uneven or irregular surfaces will provide reflection, in my opinion, is misplaced. The alleged flaw relates solely to the scale of the surface features. The same criticism applies equally to the term rough, which again requires a certain scale of its features. In other words, if uneven and irregular are too broad, so too is rough.

VI. THE '881 PATENT

A. "carrier"

39. Although "carrier" is a disputed term, Dr. Fitzgerald skipped over the term without providing any opinions or analysis. I take this to mean that that Dr. Fitzgerald does not believe this term to be technical, but instead an simple English language word that can be understood by the by a judge or jury without expert assistance. I agree that "carrier" is not a technical term that would have had a special meaning to a person having ordinary skill in the art at or around the filing date of the '881 patent, and therefore, that expert testimony on the meaning of that term is not necessary.

B. "formed on"

40. Like "carrier," the phrase "formed on" is disputed but is not addressed by Dr. Fitzgerald. Again, I take this to mean that that Dr. Fitzgerald does not believe this phrase to be technical. I agree that "formed on" is not a technical term that would have had a special meaning to a person having ordinary skill in the art at or around the filing date of the '881 patent, and therefore, that expert testimony on the meaning of that term is not necessary.

VII. THE '022 PATENT

A. "forming a first angle"

41. This is the third disputed term that Dr. Fitzgerald did not address. Again, I take this to mean that that Dr. Fitzgerald does not believe this phrase to be technical. I agree that

"forming a first angle" is not a technical term that would have had a special meaning to a person having ordinary skill in the art at or around the filing date of the '022 patent, and therefore, that expert testimony on the meaning of that term is not necessary.

B. "support base"

42. This is the fourth disputed term that Dr. Fitzgerald did not address. Again, I take this to mean that that Dr. Fitzgerald does not believe this phrase to be technical. I agree that "support base" is not a technical term that would have had a special meaning to a person having ordinary skill in the art at or around the filing date of the '022 patent, and therefore, that expert testimony on the meaning of that term is not necessary.

C. "a wavelength conversion layer disposed on said first main surface and/or second main surface of said light emitting device"

43. Claims 1 and 2 of the '022 patent provide:

> 1. A light emitting apparatus, comprising:
>
> at least one light emitting device, including:
>
> a substrate, having a support surface; and
>
> at least one light emitting diode chip comprising a plurality of light emitting surfaces, disposed on said support surface of said substrate, one of said light emitting surfaces and said support surface forming a first main surface, wherein a light emitting angle of said light emitting diode chip is wider than 180°, and a portion of light emitted by said light emitting diode chip penetrates into said substrate from said support surface and emerges from a second main surface of said substrate opposing said first main surface; and
>
> a support base, coupled to said light emitting device, and forming a first angle with said substrate.
>
> 2. The light emitting apparatus of claim 1, further comprising a wavelength conversion layer disposed on said first main surface and/or on said second main surface of said light emitting device, wherein said wavelength conversion layer receives at least a portion of the light emitted by said light emitting diode chip and converts the wavelength thereof.

44. Claim 2 indicates that two main surfaces are present: "first main surface . . . of said light emitting device"; and "second main surface of said light emitting device." Neither

"main surface," however, is properly introduced in claim 1. Instead, claim 1 includes the phrases "one of said light emitting surfaces and said support surface forming a first main surface" and "a second main surface of said substrate." I understand that this is known as a lack of antecedent basis, because it is unclear what relationship exists between the phrase in claim 2 and the phrase in claim 1.

D. "said support base includes a support member and said light emitting device is disposed on said support member"

45. This is the fifth disputed term that Dr. Fitzgerald did not address. Although Dr. Fitzgerald apparently did not believe he had anything specific to add regarding the proper construction of this term, I believe that I do. Specifically, I have been asked to give my opinion whether the term "support member" would have been understood to be a specific structure at the time that the '022 patent was filed. My opinion is that a "support member" would not have been understood by a person of ordinary skill in the art to refer to a specific form of type of structure. Instead, the term is entirely generic.

VIII. THE '340 PATENT

A. "electrode"

46. I understand that the parties have disputed the construction of the word "electrode." Lowe's and Epistar agree that an electrode refers to an electrical conductor. Lowe's further defines electrode as how electricity enters or leaves an object, which I believe is consistent with how a person having ordinary skill in the art as of the time of the filing of the '340 patent would have understood the term. In other words, I believe that the plain and ordinary meaning of "electrode" is a conductor through which electricity enters of leaves an object.

47. Dr. Fitzgerald disagrees with Lowe's' construction, asserting that an "electrode" must not be "part of the carrier." I don't believe that the plain and ordinary meaning of the term

implies anything at all about a carrier. It appears that Dr. Fitzgerald's opinion is based on aspects of the description and figures of the '340 patent. In paragraph 45 of his declaration, for example, Dr. Fitzgerald repeated cites to figures 1A, 1B, and 1C. But my understanding is that it is improper to limit broad claim terms based on details from the patent, and instead, that claim terms are given their plain and ordinary meaning.

48. Dr. Fitzgerald also criticizes Lowe's' construction by claiming that it "would also cover the light-emitting layers, as well as the epitaxial layers, contact materials on the LED, device metallization, etc." (Fitzgerald Decl. para. 47.) Because the light-emitting layers are epitaxial layers, this statement is redundant. The statement itself is also incorrect, in that those layers would have been understood as semiconductor layers, not conductor layers as stated in Lowe's' construction. Semiconductor layers get their name because they are substantially less conductive than conductors yet more conductive than insulators. As an example, some older texts use the term semi-insulators instead of semiconductors, emphasizing how much lower the conduction is in a semiconductor than a conductor. I also note that Epistar's construction would suffer the same alleged defect as Lowe's'. Finally, because an LED's contact materials are often referred to as electrodes, I disagree that such an exclusion is required by the term "electrode." Instead, as explained above, the word electrode would have been understood broadly by a person having ordinary skill in the art.

B. "a transparent body covering the first part, the second part, the third part and the first light-emitting unit"

49. Dr. Fitzgerald appears to believe that this is a technical term that would have been understood to have a particular plain and ordinary meaning to a person having ordinary skill in the art as of the filing date of the '340 patent. I disagree. The claim term is simple and straightforward and could be understood directly by a judge or jury. In fact, rather than trying to

interpret the claim language as written, what Dr. Fitzgerald seeks is to add requirements from the specification into the claims.

50. First, he gives the opinion that the structure must be "used to protect the LEDs from damage and exposure to the ambient." I don't see anything in the claim language that requires protection. Second, he criticizes Lowe's' construction because in his view the construction would include "cover 50 of a light bulb." (Fitzgerald Decl. para. 49.) Nowhere does Dr. Fitzgerald explain why a cover must be excluded from the broad term "transparent body." Rather than an explanation or analysis, he merely provides a conclusion. Third, Dr. Fitzgerald gives the opinion that a "transparent body" must directly contact the structures that it is covering. I see no reason that direct contact is implicated by the claim language, which uses the broad non-technical word "covering." His opinion seems entirely based on limiting the claim based on features described in the specification, which I understand is improper.

C. "the first part extends beyond the side surface"

51. This is another disputed term that Dr. Fitzgerald did not address. Again, I take this to mean that that Dr. Fitzgerald does not believe this phrase to be technical. I agree that "the first part extends beyond the side surface" is not a technical term that would have had a special meaning to a person having ordinary skill in the art at or around the filing date of the '340 patent, and therefore, that expert testimony on the meaning of that term is not necessary.

D. "wherein the first part and the third part are electrically separated from each other when the first light-emitting unit is not disposed on the top surface"

52. Here again, Dr. Fitzgerald did not address a disputed claim term. Here, I believe that expert opinion on the meaning of the claim term would be helpful. The language of claim 5 as written requires a change from one state to another, with a first light-emitting unit initially disposed on a top surface of the carrier, and then at some point in time the light-emitting unit is

no longer disposed on the top surface. In other words, the light-emitting unit must be removed, and at that time the first part of the first electrode and the third part of the second electrode become electrically separated. As Dr. Fitzgerald correctly explains, the LED is no longer operational once the connections to the electrodes are separated. (Fitzgerald Decl. para. 50.) The claim language as written, therefore, requires that the device is changed to a non-operational state.

E. "covers a side surface"

53. This is another disputed term that Dr. Fitzgerald did not address. Again, I take this to mean that that Dr. Fitzgerald does not believe this phrase to be technical. I agree that "covers a side surface" is not a technical term that would have had a special meaning to a person having ordinary skill in the art at or around the filing date of the '340 patent, and therefore, that expert testimony on the meaning of that term is not necessary.

IX. THE '455 PATENT

A. "top surface"

54. Once again, Dr. Fitzgerald did not address this disputed term. Although I take this to mean that that Dr. Fitzgerald does not believe this phrase to be one where expert testimony would be helpful, for this term I disagree. While some technologies have a natural orientation in space, a person having ordinary skill in the art as of the effective filing date of the '455 patent would not have understood the term "top surface" to imply a meaning other than a surface opposite a "bottom surface." As shown in figure 6 of the '881 patent, figures 2A through 2C of the '022 patent, and figures 5A through 5C of the '340 patent, LEDs can be mounted in a number of different orientations. Indeed, figures 4 through 6 of the '455 patent indicate that an LED can be flipped over during manufacture, with what could be termed the top becoming what could be termed the bottom.

B. "a first electrode arranged on the first transparent layer and the second transparent layer which are not covered by the active layer"

55. I have reviewed this claim language and find it to be a clear drafting error. The language requires that the active layer does not cover the first transparent layer and the second transparent layer. That, however, is not what the specification describes, which is a first transparent layer and a second transparent layer that are covered by the active layer. I can think of no way to interpret the claim in a proper manner except by deleting the word "not." I don't see how that is an interpretation of the claim. Instead, it would be rewriting the claim to correct a mistake.

C. "the second transparent layer and the transparent substrate have outmost sidewalls which are not coplanar with each other"

56. The language here seems pretty simple, although my understanding is that Epistar selected it for construction. To the extent that a construction is necessary, I understand this term to mean that the outermost side surfaces of the second transparent layer are not on the same plane as the outermost side surfaces of the transparent substrate.

57. Rather than try to explain what the claim language means, Dr. Fitzgerald focuses on how the described structure may be used. As I read the claim language, however, there is nothing about how the structure will be used, but instead the language is directed only to what the structure is. Thus, while the claim language does not preclude a structure from being used as a waveguide, nothing in the claim language requires such properties.

I declare under penalty of perjury under the laws of the United States of America that the foregoing is true and correct.

Executed this 30th day of December in Atlanta, Georgia.

By:_____
Alan Doolittle